

## COMMUNICATION APPARATUS

### BACKGROUND OF THE INVENTION

#### Field of the Invention

5           The present invention relates to ring type multi-address communications.

#### Related Background Art

          In the case of a conventional facsimile equipment,  
transmission of one data to a plurality of addresses  
10   (or destination) has generally been carried out by  
means of multi-address transmission, that is, a  
transmission method, which transmits identical data to  
a plurality of addresses by executing sequential  
facsimile communications with addresses targeted for  
15   transmission. However, since multi-address  
transmission is executed to all the addresses from one  
facsimile equipment, this transmission method has  
resulted in the uneven distribution of communication  
costs among the facsimile equipments, and has had a  
20   problem of the impossibility of receiving from other  
facsimile equipments during the execution of multi-  
address transmission. As one example of the measures  
to solve such a problem, there has been presented a  
ring type multi-address transmission method, which is  
25   designed to sequentially perform transmission from a  
facsimile equipment FAXA to FAXB, from FAXB to FAXC,  
from FAXC to FAXD, and from FAXD to FAXA.

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However, such a ring type multi-address transmission method has had a drawback that it is impossible to determine whether the operator of a facsimile equipment having received data regarding ring type multi-address transmission has seen the data or not. Particularly, in activities of in-town circle meetings, and so on, it is important to verify whether the users of all the addresses have seen the data or not.

#### SUMMARY OF THE INVENTION

An object of the invention is to provide a facsimile equipment capable of surely showing data regarding ring type multi-address transmission to the operator of the facsimile equipment having received the data.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a view showing a general constitution of a facsimile equipment according to the preferred embodiments of the invention.

Fig. 2 is a view illustrating an example of registration of a sub-address signal and communication specifications corresponding to a memory box in an example of ring type multi-address transmission.

Fig. 3 is a view illustrating a memory constitution of a memory 18.

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Fig. 4 is a flowchart showing a facsimile transmission control procedure of a facsimile equipment according to a first embodiment of the invention.

5 Fig. 5 is a flowchart showing the facsimile transmission control procedure of the facsimile equipment of the first embodiment.

Fig. 6 is a flowchart showing the facsimile transmission control procedure of the facsimile equipment of the first embodiment.

10 Fig. 7 is a flowchart showing the facsimile transmission control procedure of the facsimile equipment of the first embodiment.

15 Fig. 8 is a flowchart showing the facsimile transmission control procedure of the facsimile equipment of the first embodiment.

Fig. 9 is a flowchart showing the facsimile transmission control procedure of the facsimile equipment of the first embodiment.

20 Fig. 10 is a flowchart showing a facsimile transmission control procedure of a facsimile equipment according to a second embodiment of the invention.

Fig. 11 is a flowchart showing the facsimile transmission control procedure of the facsimile equipment of the second embodiment.

25 Fig. 12 is a flowchart showing a facsimile transmission control procedure according to a third embodiment of the invention.

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Fig. 13 is a flowchart showing the facsimile transmission control procedure continued from Fig. 12

Fig. 14 is a flowchart showing the facsimile transmission control procedure continued from Fig. 13.

5 Fig. 15 is a flowchart showing the facsimile transmission control procedure continued from Fig. 14.

Fig. 16 is a flowchart showing the facsimile transmission control procedure continued from Fig. 15.

10 Fig. 17 is a flowchart showing the facsimile transmission control procedure continued from Fig. 16.

Fig. 18 is a flowchart showing the facsimile transmission control procedure continued from Fig. 17.

Fig. 19 is a view showing a memory map of a ROM 24 as a storage medium.

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#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

(Embodiment 1)

20 Next, description will be made of the preferred embodiments of the invention with reference to the accompanying drawings.

Fig. 1 is a view showing a general constitution of a facsimile constitution according to the preferred embodiments of the invention.

25 As shown in Fig. 1, the facsimile equipment of the preferred embodiments of the invention comprises a network control unit (referred to as "NCU", hereinafter) 2 connected to a telephone line 2a.

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The NCU 2 is connected to a terminal of the telephone line to use a telephone exchange network for data communications, and so on, and adapted to perform connection control of the telephone exchange network, switching to a communication channel and loop holding. The NCU 2 also connects the telephone line 2a to a telephone set 4 side (CML OFF) via a signal line 2b based on control from a bus 26, and connects the telephone line 2a to a facsimile equipment side (CML ON) via a signal line 2c. Usually, the telephone line 2a is connected to the telephone set 4 side.

A hybrid CKT 6 separates a signal transmitted via the telephone line 2a from a transmission system from a signal received via the telephone line 2a from a receiving system. In addition, the hybrid CKT 6 sends out a signal transmitted from an adder CKT 12 to the telephone line 2a through the NCU 2, receives a signal from a partner station through the NCU 2, and sends out the received signal to a modem 8 via a signal line 6a.

The modem 8 performs modulation/demodulation based on ITU-T Recommendations V. 8, V. 21, V. 27ter, V. 29, V. 17, and V. 34, and each transmission mode is specified by means of control of the bus 26. The modem 8 receives a signal transmitted through the bus 26, outputs modulated data to the adder CKT 12 via a signal line 8a, receives a signal from the hybrid CKT 6 via the signal line 6a, and then outputs demodulated data

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The memory 18 includes a memory for registering a telephone number of own station, and a memory for registering a sub-address and communication specifications corresponding to a memory box. As an exemplary registration of such sub-address signal communication specifications, Fig. 2 shows ring type

multi-address transmission, for example, ones corresponding to memory boxes in respective facsimile equipments FAXA, FAXB, FAXC and FAXD.

5 With regard to a memory constitution of the memory 18, as shown in Fig. 3, a telephone number of own station is registered in an address 0; a sub-address and communication specifications corresponding to the memory box in an address 1; and a ring multi-address transmission method for a next station in an address 2. For example, for the FAXB, 03-3111-2222 is registered as a telephone number of own station.

10 In the described case, in the ring type multi-address transmission of facsimile equipments FAXA to FAXD as shown in Fig. 2, for example, 1234 is registered as a sub-address corresponding to a memory box 01 for each of the facsimile equipment (e.g. FAXB) and, as communication specifications therefor, ring type multi-address transmission for a next station (e.g. FAXC) is registered.

20 An operation unit 20 includes a one-touch dial, an abbreviation dial, a ten key, a # key, a start key, a set key, a stop key, own station telephone number registration key, a specification registration key of a memory box, and other function keys, and a display unit. Key data is outputted to the bus 26. The operation unit 20 also receives data outputted to the bus 26, and displays the received data.

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A central processing unit (CPU) 22 executes overall control for the facsimile equipment, and a later-described facsimile transmission control procedure. A control program thereof is stored in a ROM 24.

Figs. 4 to 9 are flowcharts showing in sequence a facsimile transmission control procedure of the facsimile equipment according to a first embodiment of the invention.

This procedure is now explained by targeting the facsimile equipment FAXB, and the explanation can also be applied to the other facsimile equipments FAXA, FAXC and FAXD.

First, the memory 18 is subjected to initialization via the bus 26 (step S2), the display unit of the operation unit 20 is cleared via the bus 26 (step S4), and the CML of the NCU 2 is turned OFF to connect the telephone line 2a to the telephone set 4 side via the bus 26 (step S6).

Subsequently, the data of the operation unit 20 is entered via the bus 26, and determination is made as to whether the registration of own station telephone number has been selected or not in an address 20 of the memory 18 (step S8). If it is determined that the registration of the own station telephone number has been selected, as the own station telephone number of the memory 18, for example, 03-3111-2222 is registered

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5                   In step S12, the data of the operation unit 20  
is entered via the bus 26, and determination is made as  
to whether the registration of a sub-address and  
communication specifications corresponding to a memory  
box has been selected or not. If it is determined that  
10 the registration of the sub-address and communication  
specifications corresponding to the memory box has been  
selected, as the sub-address and communication  
specifications, for example, a sub-address signal 12324  
and ring type multi-address transmission as  
15 communication specifications to a next station FAXC  
corresponding to a memory box 01 are registered in an  
address 1 of the memory 18 via the bus 26 (step S14),  
and then the process moves to step S16. On the other  
hand, if the registration has not been selected, then  
20 the process moves to step S14 skipping step S16.

In step S16, via the bus 26, determination is made as to whether the ring type multi-address transmission designation key of the operation unit 20 has been depressed or not. If it is determined that the ring type multi-address transmission designation key has been depressed, then the CML of the NCU 2 is turned ON to connect the telephone line 2a to the

facsimile equipment side via the bus 26 (step S18), and calling is made to a next station FAXC via the bus 26 by using the calling CKT 10 (step S20). Then, a pre-procedure is executed to transmit the own station  
5 telephone number stored in the address 0 of the memory 18 as a ring type multi-address transmission start telephone number, and transmit 1234 as a sub-address signal (step S22). Image signal transmission is carried out (step S24), and then after a post procedure  
10 is executed (step S26), the process returns to step S6.

If it is determined in step S16 that the ring type multi-address transmission designation key has not been depressed, then the process moves to step S28, where determination is made via the bus 26 as to  
15 whether the ring type multi-address transmission continuation key of the operation unit 20 has been depressed or not. If it is determined in step S28 that the ring type multi-address transmission continuation key of the operation unit 20 has been depressed, the  
20 process moves to step S30, where determination is made via the bus 26 as to whether the display unit of the operation unit 20 indicating the presence of data received by ring type multi-address transmission is ON or not. If it is determined in step S30 that the  
25 display unit of the operation unit 20 indicating the presence of data received by ring type multi-address transmission is ON, then the process moves to step S32,

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where, determination is made as to whether the printing of data memory-received with the sub-address 1234 has been finished or not. If it is determined in step S32 that the printing of the memory-received data has been finished, the CML of the NCU 2 is turned ON to connect the telephone line 2a to the facsimile equipment via the bus 26 (step S34), and calling is made to the next station FAXC via the bus 26 by using the calling CKT 10 (step S36). A pre-procedure is executed to transfer the ring type multi-address transmission start telephone number received when the data was memory-received (stored in the address 4 of the memory 18) to next station FAXC, and a sub-address 1234 to the same (step S38), and the data received with the sub-address 1234 is transmitted to the next station FAXC (step S40). Then, after the execution of a post procedure, the CML of the NCU 2 is turned OFF to connect the telephone line 2a to the telephone set 4 side via the bus 26 (step S44). The display of the display unit indicating the presence of data received by the ring type multi-address transmission is cleared (step S46), and the process returns to step S6.

If it is determined in step S32 that the printing of the memory-received data has not been finished, "DATA MEMORY-RECEIVED BY RING TYPE MULTI-ADDRESS TRANSMISSION CANNOT BE TRANSFERRED BEFORE PRINTOUT THEREOF TO NEXT FAX STATION" displayed on the

not-shown display unit via the bus 26 (step S48), and the process returns to step S6. The display in step S48 should be erased by actuation of any one of the keys.

5           If it is determined in step S30 that there is no display indicating the presence of data received by the ring type multi-address transmission on the display unit, then "TO-BE-TRANSFERRED DATA MEMORY-RECEIVED BY RING TYPE MULTI-ADDRESS TRANSMISSION IS ABSENT" is  
10 displayed on the not-shown display unit via the bus 26 (step S50), and the process returns to step S6. The display in step S50 should be erased by actuation of any one of the keys.

15           If it is determined in step S28 that the ring type multi-address transmission continuation key of the operation unit 20 has not been depressed, then the process moves to step S5, where determination is made as to whether the ring type multi-address transmission received data printing key of the operation unit 20 has  
20 been depressed or not via the bus 26. If it is determined that the ring type multi-address transmission received data printing key of the operation unit 20 has been depressed, then the process moves to step S54, where determination is made as to  
25 whether the display unit of the operation unit 20 indicating the presence of data received by ring type multi-address transmission is ON or not via the bus 26.

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If it is determined that the display unit of the operation unit 20 indicating the data received by the ring type multi-address transmission is ON, then the data memory-received with the sub-address 1234 is  
5 printed out (step S56), and the process returns to step S6. If the display unit is not ON, "TO-BE-PRINTED DATA MEMORY-RECEIVED BY RING TYPE MULTI-ADDRESS TRANSMISSION IS ABSENT" is displayed on the not-shown display unit via the bus 26 (step S58), and then the process returns  
10 to step S6.

If it is determined in step S52 that the ring type multi-address transmission received data printing key of the operation unit 20 has not been depressed, then the process moves to step S60, where determination  
15 is made as to whether there is any facsimile reception or not. If the presence of facsimile reception is determined, then the CML of the NCU 2 is turned ON to connect the telephone line 2a to the facsimile equipment side via the bus 26 (step S64, and specified  
20 processing of step S66 and thereafter is executed. On the other hand, if any facsimile reception is absent, other processing is executed (step S62), and then the process returns to step S6.

Specified processing of step S66 and thereafter  
25 is carried out as follows.

First, in a pre-procedure, the presence of the receiving function of a sub-address signal is notified

to a partner facsimile station (S66), and then determination is made as to whether a sub-address signal has been received from the partner station or not (step S68). If it is determined that the sub-address signal has not been received, then an image signal is received/recorded (S70). After the execution of a post procedure, the process returns to step S6.

If the presence of the received sub-address signal is determined in step S68, then the process moves to step S74, where determination is made as to whether the sub-address signal is 1234 or not. If it is determined that the sub-address signal is not 1234, reception processing corresponding to the sub-address signal is executed (step S76), and the process returns to step S6. On the other hand, if the sub-address signal is determined to be 1234, then an image signal is memory-received (step S78) and, after the execution of a post procedure (step S80), the CML of the NCU 2 is turned OFF to connect the telephone line 2a to the telephone set 4 side via the bus 26 (step S82).

Determination is then made as to whether the received ring type multi-address transmission start telephone number (received by a procedure signal) coincides with the telephone number of own station or not (step S84).

If it is determined in step S84 that the received ring type multi-address transmission start telephone number does not coincide with the telephone

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number of own station, then the display unit of the operation unit 20 indicating the presence of data received by ring type multi-address transmission is turned ON via the bus 26 (step S86), and the process  
5 returns to step S6. On the other hand, if coincidence is determined, then the display unit of the operation unit 20 indicating the end of ring type multi-address transmission is turned ON via the bus 26 (step S88), and the process returns to step S6. The display in  
10 step S88 should be erased by actuation of any one of the keys.

According to the first embodiment of the invention, determination is made as to the specifying of ring type multi-address transmission by the sub-  
15 address signal (steps S68 and S74), the received data is memory-received if the ring type multi-address transmission is specified at the time of reception (YES in step S74) and, after the actual printing-out of the memory-received data (YES in step S32), the data is  
20 transferred to the next facsimile station (step S38). Accordingly, the transmission of the memory-received data is permitted only after its printing-out, i.e., after the operator of the facsimile equipment reads the data. Thus, it can be assured that the operator of the  
25 facsimile equipment see the data received by the ring type multi-address transmission.

(Embodiment 2)

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Figs. 10 and 11 are flowcharts showing in sequence a facsimile transmission control procedure of a facsimile equipment according to a second embodiment of the invention. Description of portions like those of the first embodiment will be omitted, and only  
5 different portions will be described.

The second embodiment is different from the first embodiment in that either one of the following cases is selected: transmission of memory-received data  
10 by specification from an operator, and automatic transmission to a next facsimile station after the end of the memory-received data. Other than this point, the second embodiment is similar to the first. Figs. 10 and 11 show only the foregoing difference.

15 In Fig. 10, after the processing in step S6 of Fig. 4, the data of the operation unit 20 is entered via the bus 26, and determination is made as to whether a ring type multi-address transmission method to a next station has been registered or not via the bus 26 (step  
20 S102). If the selection is determined, then via the bus 26, transfer by the operator or auto-transfer after the printing-out of the memory-received data as means of ring type multi-address transmission for a next station is registered in the address 2 of the memory  
25 18, and the process moves to step S8 of Fig. 4. If no selection is determined, then the process moves to step S8 of Fig. 4 skipping step S104. Thus, transmission by

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specification from the operator or automatic transmission after the printing-out of the memory-received data can be selected.

5 In Fig. 11, after the end of the processing in step S56 of Fig. 7, the data of the address 2 of the memory 18 is entered via the bus 26, and determination is made as to whether auto-transfer to the next station FAXC after the printing-out of the memory-received data has been selected or not (step S110). If the selection of auto-transfer is determined, then the memory-received data is automatically transmitted to the next station FAXC by executing processing of steps S34 to S46 of Fig. 5 and thereafter. On the other hand, if no selection of auto-transfer is determined, then the process moves to step S6 of Fig. 4.

According to the second embodiment, it is possible to prevent a case where ring type multi-address transmission is disabled when the user forgets to send transmission instruction to the next station.

20 Moreover, since the transmission of the memory-received data to the next station by specification from the operator or the transmission to the same after the printing-out of the memory-received data can be selected, the transmission of the memory-received data can be performed manually or automatically based on selection made by the operator. Thus, it is possible to improve usability of the facsimile equipment.

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(Embodiment 3)

In the first and second embodiments, the data received by the ring type multi-address transmission is stored in the memory and, under the condition that the user has printed out the data, transmission of the data to the next station is permitted or executed.

However, the problem of cutting-off of the ring type multi-address transmission in the midway has occurred if a member of the group for the ring type multi-address transmission is not at home for a long time.

Therefore, an object of a third embodiment is to provide an apparatus capable of uniformly distributing communication costs, verifying that the user of the group of multi-address transmission sees received data, and transferring the data to a next station even if the user of the group is not at home for a long time.

In the third embodiment, portions like those of the first embodiment are denoted by like reference numerals, and description thereof will be omitted.

In the third embodiment, the memory 18 of Fig. 1 includes a memory provided to register a nickname, a sub-address signal, and the telephone number of a next station corresponding to a ring type multi-address transmission number, and store the time, the date, the hour and minute of ring type multi-address transmission reception.

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5           Then, after the execution of ring type multi-address reception, its time is stored, the presence of data received by ring type multi-address transmission is displayed, and transfer to a next station is executed based on transfer selection of the data

ring type multi-address transmission.

Figs. 12 to 18 are flowcharts showing in sequence a facsimile transmission control procedure. A processing program therefor is stored in the ROM 24 as described above, and executed by the CPU 22.

25           After the start of processing (step S100),  
first, the memory 18 is subjected to initialization via  
the bus 26 (step S102). The display unit of the

operation unit 20 is cleared via the bus 26 (step S104). Then, the CML of the NCU 2 is turned OFF via the bus 26 (step S106).

Subsequently, the data of the operation unit 20  
5 is entered via the bus 26, and determination is made as to whether registration in the memory 18 has been selected or not (step S108). If selection of the registration in the memory 18 is determined, a  
10 nickname, a sub-address signal and the telephone number of a next station corresponding to a ring type multi-address transmission number are registered in the memory 18 via the bus 26 (step S110). For example, corresponding to a ring type multi-address transmission number 01, transfer for kindergarten circulation  
15 (nickname), 1234 (sub-address signal) and 03-3111-1234 (telephone number of next station) is registered. On the other hand, no selection of registration in the memory 18 is determined in step S108, then the process moves to step S112.

20 The data of the operation unit 20 is entered via the bus 26, and determination is made as to whether ring type multi-address transmission start has been selected or not (step S112). If the selection of the ring type multi-address transmission start is  
25 determined, then a nickname for performing ring type multi-address transmission, e.g., kindergarten circulation, is entered (step S114). The CML of the

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NCU 2 is turned ON via the bus 26 (step S116).

Calling is made to the telephone number "03-3111-1234" via the bus 26 by using the calling CKT 10 (step S118), and a pre-procedure is executed (step  
5 S120). In the pre-procedure, "1234" is transmitted as a sub-address signal. Further, reading/transmitting of an image signal is carried out (step S122), and a post procedure is executed (step S124). Then, the process returns to step S106.

10 On the other hand, if no selection of the ring type multi-address transmission start is determined in step S112, then the data of the operation unit 20 is entered via the bus 26, and determination is made as to whether the printing of data received by ring type  
15 multi-address transmission has been selected or not (step S126). If selection of the printing of the received data is determined, then the selected data received by the ring type multi-address transmission corresponding to the nickname is printed out (step  
20 S128). Then, the process moves to step S106. On the other hand, if no selection of the printing is determined, then the process moves to step S130.

In step S130, the data of the operation unit 20 is entered via the bus 26, and determination is made as  
25 to whether the transfer of the data received by the ring type multi-address transmission has been selected or not. If no selection of the transfer of the data

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received by the ring type multi-address transmission is determined, then the process moves to step S152. On the other hand, if selection of the transfer of the data received by the ring type multi-address

5 transmission is determined, then from the data received by the ring type multi-address transmission, the nickname to be transferred, e.g., kindergarten circulation, is entered (step S132).

10 Then, the CML of the NCU 2 is turned ON via the bus 26 (step S134), and calling is made to the telephone number "03-3111-1234" via the bus 26 by using the calling CKT 10 (step S136). A pre-procedure is executed (step S138). In the pre-procedure, a sub-address signal "1234" is transmitted. Further, as  
15 kindergarten circulation, the data received by the ring type transmission (memory-received) is transmitted (step S140), and a post procedure is executed (step S142). Then, the CML of the NCU 2 is turned OFF via the bus 26 (step S144).

20 Determination is made as to whether there have been any communication errors or not (step S146). If no communication errors are determined, all the transferred data received by the ring type multi-address transmission are erased from the memory (step  
25 S148). On the other hand, if the occurrence of a communication error is determined, "ERROR OCCURS IN TRANSFER OF DATA RECEIVED BY RING TYPE MULTI-ADDRESS

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5 In step S152, determination is made as to the presence of any data received by the ring type multi-address transmission 24 hours before. If the presence of data received 24 hours before is determined, for example, if one data  $a$  of the kindergarten circulation received by the ring type multi-address transmission 24 hours before is present (step S154), then the CML of the NCU 2 is turned ON via the bus 26 (step S156). Further, calling is made to the telephone number "03-3111-1234" via the bus 26 by using the calling CKT 10 (step S158), and a pre-procedure is executed (step S160). In the pre-procedure, a sub-address "1234" is transmitted. Then, after the reception, the data  $a$  received by the ring type multi-address transmission 24 hours before is transmitted (step S162). A post procedure is executed (step S164), and the CML of the NCU 2 is turned OFF via the bus 26 (step S166).

Further, determination is made as to the occurrence of any communication errors (step S168). If the occurrence of a communication error is determined, then the process returns to step S150.

On the other hand, if no communication errors are determined, then the transferred data received by

the ring type multi-address transmission is printed out, and information that "THIS DATA IS TRANSMITTED BECAUSE OF ELAPSE OF 24 HOURS AFTER RECEPTION THEREOF BY RING TYPE MULTI-ADDRESS TRANSMISSION" is added to  
5 the first page of the print (step S170). Then, the process returns to step S148.

On the other hand, if it is determined in step S152 that there are not data received 24 hours before, then determination is made as to the selection of  
10 reception (step S172). If no selection of reception is determined, other processing is executed (step S174), and then the process returns to step S106. On the other hand, if the selection of reception is determined, then the CML of the NCU 2 is turned ON via  
15 the bus 26 (step S176), and a pre-procedure is executed (step S178). In the pre-procedure, the presence of a function of receiving the sub-address signal is notified.

Then, determination is made as to the reception  
20 of the sub-address signal (step S180). If no reception of the sub-address signal is determined, then receiving/recording of an image signal is executed (step S182), and a post procedure is carried out (step S184). On the other hand, if the reception of the sub-  
25 address signal is determined, then determination is made as to whether the sub-address signal is "1234" or not (step S186). If the sub-address signal is not

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25           Also, when the transfer of the data received by  
the ring type multi-address transmission is normally  
finished, the data received by the ring type multi-

**Abstract**

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equipment can receive the effect of the invention.

Fig. 19 is a view showing a memory map of the ROM 24 as a storage medium. The ROM 24 stores facsimile transmission control program modules, and so on, shown in the flowcharts of Figs. 12 to 18. As a storage medium for supplying such a program module, other than the ROM, for example, a floppy disk, a hard disk, a CD-ROM, a nonvolatile memory card or the like can be used.

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